

# Comparing option3, option4 and survey mode

## Summary of observation strategies

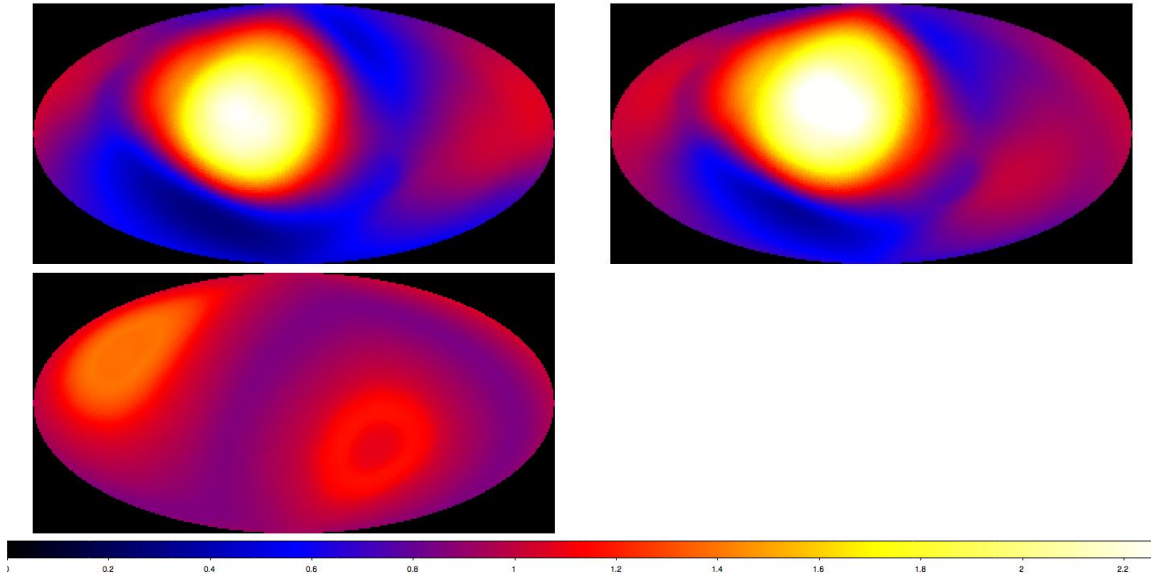
Both option 3 and option 4 are combinations of inertial pointed observation of a target with RA=XX (5 deg offset for Galactic center RA) and a declination chosen to be on the orbit equator. This provides relatively uniform all-sky coverage, which simultaneously providing a boost in exposure at the Galactic center. In both cases, the declination is updated once per week (in implementation, we would plan to do this daily).

An 108 day orbit/attitude simulation was made for each strategy, along with a 50 deg rocking survey profile for comparison.

In the plots/metrics which follow a zenith cut of 100 deg has been applied (via a zmax option in gtltcube) and P7SOURCE\_V6 IRF at 10 GeV has been used to evaluate exposure. Note that the FoV of the LAT is somewhat smaller at lower energies, so sky coverage will be less uniform if evaluated at 100 MeV.

## 108 day integration

The plot below show exposure maps at 10 GeV in Galactic coordinates. The top left is option3, top right is option4 and bottom is survey mode. Option 4 looks more uniform compared with option 3.

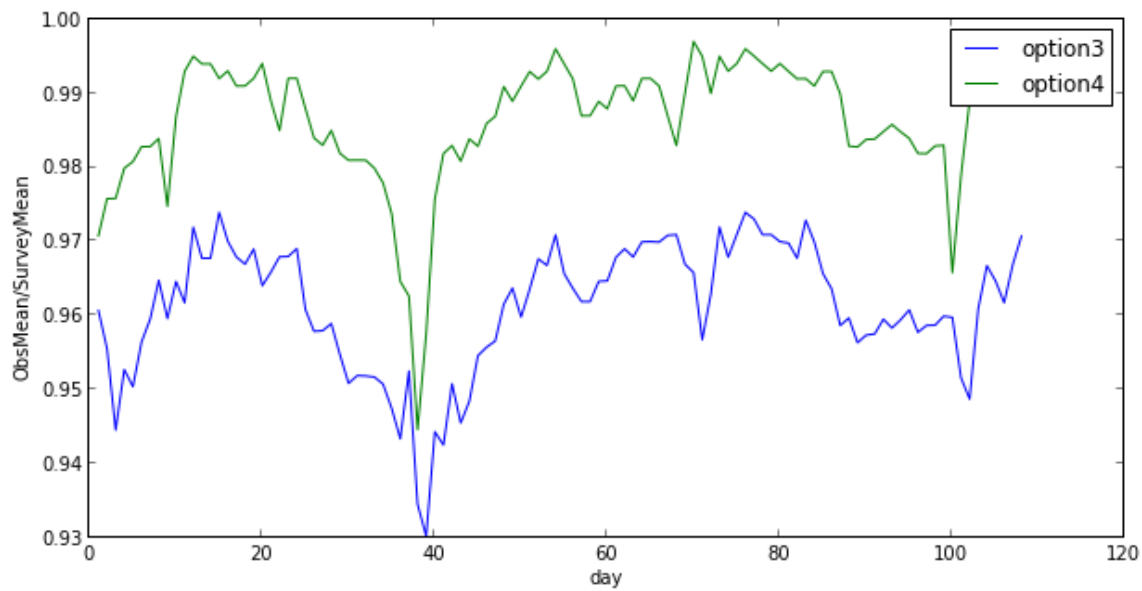


## Daily integrations

I divided the spacecraft file into a sequence of one day intervals and created an all-sky exposure map for each day.

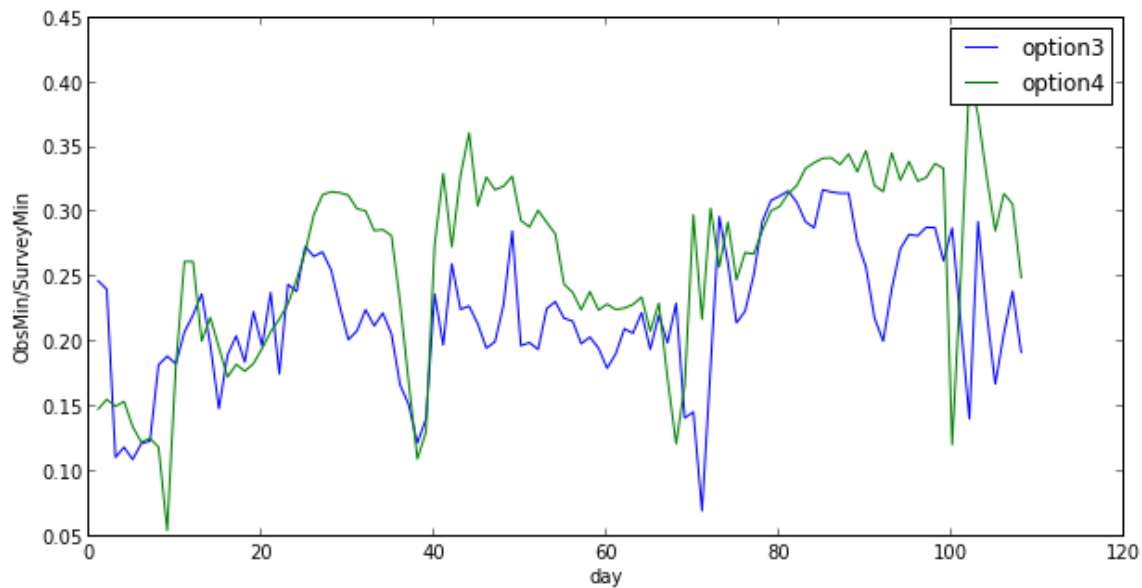
## Mean exposure

The mean exposure integrated over the entire sky is a measure of the efficiency of the observation. It will decrease if the LAT FoV is occulted by the Earth. In the plot below, I show mean exposure as a fraction of the mean exposure in survey mode as a function of time. Option 4 is a few percent more efficient compared with option 3.



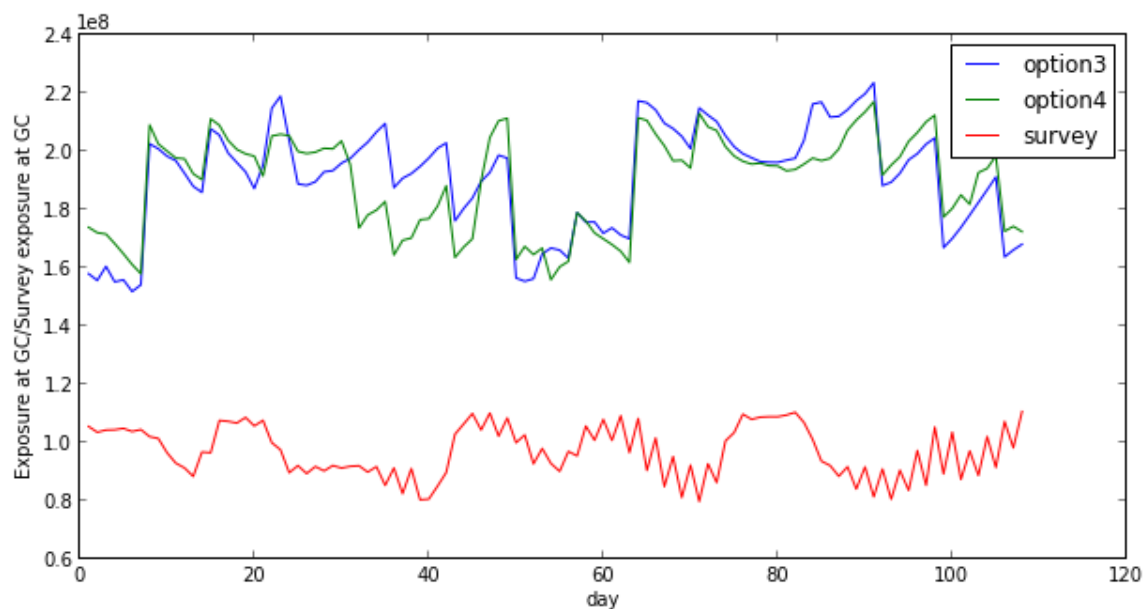
### ***Minimum exposure***

The minimum exposure in a 1x1 deg pixel is shown in the plot below. On timescales of one day, both option3 and option4 have all sky exposure. The minimum for option 4 is larger than for option 3 – as expected since the sky exposure is a little more uniform.



### ***Exposure at the Galactic Center***

The exposure at the Galactic center is similar for option 3 and option 4.



## Two orbit integrations

It's also interesting to look on shorter timescales. The histogram below shows the minimum exposure for option 3 and option 4 on timescales of two orbits. Less than 10% of the two orbit intervals have an exposure of zero. The minimum exposure distribution is shifted to higher values for option 4.

